

REMARKS

This is intended as a full and complete response to the Office Action dated July 29, 2005, having a shortened statutory period for response set to expire on October 29, 2005. Please reconsider the claims pending in the application for reasons discussed below.

Claims 11-13, 15-18, and 21 remain pending in the application and are shown above. Claim 8 has been canceled by Applicants. Claims 11-13, 15-18, and 21 stand rejected by the Examiner. Reconsideration of the rejected claims is requested for reasons presented below.

Applicants have added new claims 22-28 to claim additional aspects of the invention. Applicants submit that the changes made herein do not introduce new matter.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sugahara, et al.* (U.S. Patent No. 5,989,998), in view of *Chiang, et al.* (U.S. Patent No. 5,817,572) and *Misawa, et al.* (U.S. Patent No. 6,150,725). Applicants submit that the rejection of claim 8 is moot as Applicants have canceled claim 8.

Claims 11-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Havemann* (U.S. Patent No. 5,482,894) in view of *Sugahara, et al.* The Examiner states that *Havemann* teaches a method of forming a plurality of layers including the steps of forming a silicon oxide layer on a substrate, forming an organic SOG layer on said silicon oxide layer, and forming a photoresist layer on said organic SOG layer. The Examiner acknowledges that *Havemann* fails to teach that the organic layer is deposited in a plasma-enhanced process from a mixture comprising an organosilane compound and an oxidizing gas. The Examiner further states that *Sugahara, et al.* teaches a method of depositing a plurality of layers wherein one or more of the layers is a low dielectric constant oxidized organosilane layer that is deposited in a plasma enhanced process from a mixture comprising an organosilane compound and an oxidizing gas. Applicants respectfully traverse the rejection.

Applicants respectfully submit that while the Examiner has described methods provided by *Havemann* and *Sugahara, et al.*, the Examiner has not provided any evidence that the combination of *Havemann* and *Sugahara, et al.* provides or suggests

a method of depositing a plurality of layers comprising one low dielectric constant oxidized organosilane layer that is deposited by a plasma enhanced process from a mixture comprising an organosilane compound and an oxidizing gas and a layer selected from the group consisting of parylene, FSG, and silicon oxide layers. The mere recitation of a combination of references does not amount to particularly identifying a suggestion, teaching, or a motivation to combine the references. (See, M.P.E.P. § 2143.) The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, not in the applicants' disclosure. See M.P.E.P. § 2143, citing *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). Still further, the examiner must particularly identify any suggestion, teaching or motivation from within the references to combine the references. See *In Re Dembiczak*, 50 USPQ2d 1614 (Fed. Cir. 1999).

Applicants respectfully submit that *Havemann* in view of *Sugahara, et al.* does not teach, show, or suggest a method comprising depositing on a substrate a plurality of layers, wherein the plurality of layers comprises one low dielectric constant oxidized organosilane layer comprising carbon, wherein the low dielectric constant oxidized organosilane layer is deposited in a plasma enhanced process from a mixture comprising an organosilane compound and an oxidizing gas and the carbon content of the low dielectric constant oxidized organosilane layer is from 1% to 50% by atomic weight, a layer selected from the group consisting of parylene, FSG, and silicon oxide layers, and a top layer of the plurality of layers that is a photoresist, as recited in claim 11. Applicants respectfully request withdrawal of the rejection of claim 11 and of claims 12-13, which depend thereon.

Claims 15-18 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sugahara, et al.* in view of *Chiang, et al.* and *Matsuura* (U.S. Patent No. 6,124,641). The Examiner states that *Sugahara, et al.* teaches a method of depositing a plurality of layers, wherein one or more of the layers is a low dielectric constant oxidized organosilane layer comprising carbon and is deposited in a plasma enhanced process from a mixture comprising an organosilane compound and an oxidizing gas, wherein said organosilane compound is selected from a phenylsilane or a vinylsilane group, and etching the one or more layers in a patterning process. The

Examiner further states that *Chiang, et al.* teaches a method of patterning a plurality of dielectric layers, wherein said patterning can be performed using a photoresist as a mask, and that it would have been within the scope of one of ordinary skill in the art to combine the teachings of *Sugahara, et al.* and *Chiang, et al.* to enable using a photoresist layer in the patterning process of *Sugahara, et al.* The Examiner also states that while the combined teachings of *Sugahara, et al.* and *Chiang, et al.* fail to teach using a methylsilane compound as the organosilane compound, it would have been within the scope of one of ordinary skill in the art to combine the teachings of *Sugahara, et al.* and *Chiang, et al.* with *Matsuura*, which uses methylsilane and vinylsilane to deposit dielectric layers. Applicants respectfully traverse the rejection.

Sugahara, et al. teaches that the presence of SiCH_3 in conventional organic SOG films is disadvantageous, since it reacts with oxygen during subsequent processing, resulting in the formation of water that contaminates the device containing the layer (column 2, lines 60-67). *Sugahara, et al.* indicates that by using an organic silicon compound having the formula $\text{R}^1_x\text{Si}(\text{OR}^2)_{4-x}$ or $\text{R}^1_x\text{SiH}_{4-x}$, wherein R^1 is a phenyl group or a vinyl group, R^2 is an alkyl group, and x is an integer of 1 to 3, the proportion of SiCH_3 in the insulating film provided therein is much lower than the amount contained in a conventional organic SOG film (column 3, lines 44-65). Thus, Applicants submit that *Sugahara, et al.* teaches away from depositing a film using a methylsilane compound, which contains a Si-CH_3 bond.

Chiang, et al. does not describe depositing low dielectric constant oxidized organosilane layers comprising carbon and thus does not add anything to *Sugahara, et al.*'s or *Matsuura*'s descriptions of precursors for depositing low dielectric constant layers.

Matsuura describes using methylsilanes or vinylsilanes to deposit insulating films. However, *Matsuura* does not teach or suggest that methylsilanes and vinylsilanes can be used interchangeably to deposit identical films. *Matsuura* teaches that films comprising Si-CH_3 , Si-O , and Si-H bonds are formed when using methylsilane or methylsilane and dimethylsilane as the precursor (column 4, lines 45-48, column 5, lines 22-26, column 6, lines 5-8, lines 26-27), and that films comprising Si-CH=CH_2 , Si-O ,

and Si-H bonds are formed when using vinylsilane as the precursor (column 7, lines 15-36).

Applicants submit that there is a reasonable expectation from the combination of *Sugahara, et al.* and *Matsuura* that replacing *Sugahara, et al.*'s vinylsilane and phenylsilane precursors with *Matsuura*'s methylsilane precursors would substantially alter *Sugahara, et al.*'s layer to include unwanted Si-CH₃ bonds. Thus, Applicants submit that the Examiner's combination of *Sugahara, et al.*, *Chiang, et al.*, and *Matsuura* is improper as using *Matsuura*'s methylsilane precursors would render *Sugahara, et al.*'s layer unsatisfactory for its intended purpose (MPEP 2143.01), *i.e.*, providing a layer having a low Si-CH₃ bond content. Withdrawal of the rejection of claim 15 and of claims 16-18 and 21, which depend thereon, is respectfully requested.

Applicants submit that new claims 22-28 are patentable for the reasons discussed above with respect to claim 15, upon which new claims 22-28 depend. Applicants respectfully request allowance of new claims 22-28.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, Applicants believe that a detailed discussion of the secondary references is not necessary for a full and complete response to this office action.

Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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